

reflecting layer that controls how much of the light from the at least one laser is distributed to the at least one reference beam and how much is distributed to the plurality of sensor beams.

6. (Amended) A motion detector according to claim 1 wherein the distributor comprises a diffraction grating.

8. (Amended) A motion detector according to claim 7 wherein the at least one sensor beam comprises a plurality of sensor beams.

9. (Amended) A motion detector according to claim 8 wherein the plurality of sensor beams comprises at least three sensor beams and at least three of the sensor beams are coplanar.

10. (Amended) A motion detector according to claim 8 wherein the plurality of sensor beams comprises at least three sensor beams and at least one of the plurality of sensor beams is not coplanar with at least two of the other sensor beams.

11. (Amended) A motion detector according to claim 7 wherein the at least one reference beam comprises a plurality of reference beams.

14. (Amended) A motion detector according to claim 7 wherein the at least one photodetector is a single photodetector.

15. (Amended) A motion detector according to claim 7 and comprising a motor or actuator that cyclically moves the light distributor back and forth in a given direction so that frequency of light in the at least one reference beam is shifted by a predetermined frequency shift.

16. (Amended) A motion detector according to claim 7 comprising an optical frequency shifter through which light reflected from the body passes, which optical frequency shifter generates a predetermined frequency shift in the frequency of the reflected light.

17. (Amended) A motion detector according to claim 15 wherein the predetermined frequency shift is greater than an expected Doppler shift of the reflected light caused by motion of the body.

19. (Amended) A motion detector according to claim 12 and comprising a first and a second linear polarizer through which light that is incident on a first and a second photodetector respectively of the plurality of photodetectors passes.

22. (Amended) A motion detector according to claim 19 wherein the reference beams that are incident on the first and second photodetectors are generated by the distributor from light from a same laser of the at least one laser, which laser provides linearly polarized light.

24. (Amended) A motion detector according to claim 22 wherein an angle between the polarization direction of the first linear polarizer and the polarization direction of the laser light is substantially equal to 45° .

25. (Amended) A motion detector according to claim 22 and comprising a circular polarizer that circularly polarizes the reflected light.

26. (Amended) A motion detector according to claim 22 and comprising a circular polarizer that circularly polarizes light in the reference beams.

27. (Amended) A motion detector according to claim 25 wherein the first and second photodetectors respectively generate first and second signals responsive to reflected light and reference beam light incident on them, which first and second signals comprise, respectively, first and second signal components having a frequency equal to the Doppler frequency shift of the reflected light caused by motion of the body.

28. (Amended) A motion detector according to claim 7 wherein a photodetector of the at least one photodetector is a polarization sensitive photodetector sensitive to light in first and second directions of polarization, which photodetector generates first and second signals that are substantially independent of each other responsive to intensity of light incident on the photodetector having a polarization direction parallel respectively to the first and second directions.

31. (Amended) A motion detector according to claim 29 wherein the polarization sensitive photodetector receives light from a single reference beam and reflected light from a sensor beam,

both reference and sensor beams being generated by light from a same single laser of the at least one laser, and wherein the first and second signals have first and second signal components characterized by a frequency equal to a Doppler frequency shift of the reflected light caused by motion of the body.

32. (Amended) A motion detector according to claim 27 wherein the circuitry determines which of the first and second signal components leads the other and if the first signal component leads the second signal component determines a first direction for a component of motion of the body that generates the Doppler shift and if the second signal component leads the first signal component determines a second direction for the component of motion which second direction is opposite the first direction.

33. (Amended) A motion detector according to claim 7 wherein the at least one laser comprises a plurality of lasers.

35. (Amended) A motion detector according to claim 7 wherein light provided by a laser of the at least one laser is IR light.

36. (Amended) A motion detector according to claim 7 and comprising at least one source of visible light, wherein when the at least one source is turned on, light from the source illuminates at least one region of the surveillance zone that is illuminated by light from a sensor beam of the at least one sensor beam.

37. (Amended) A motion detector according to claim 7 wherein the at least one reference beam does not extend into the surveillance zone.

38. (Amended) An intruder detection system for detecting presence of an intruder in a surveillance zone comprising a motion detector according to claim 7 wherein if the motion detector senses motion of a body in the surveillance zone, the circuitry determines if the Doppler shift is characteristic of motion of an intruder, and if it does generates a signal indicating presence of an intruder in the surveillance zone.

39. (Amended) Apparatus for guarding an object against theft or damage comprising a motion detector according to claim 7 wherein at least one sensor beam of the motion detector is incident on the object and, if the object exhibits aberrant motion, generates an alarm.

40. (Amended) Apparatus for monitoring health status of a person comprising a motion detector according to claim 7 wherein at least one sensor beam of the motion detector is incident on the person and, if the person exhibits aberrant motion, generates an alarm.

45. (Amended) A method according to claim 43 wherein the at least one reference beam comprises a plurality of reference beams.

47. (Amended) A method according to claim 46 wherein determining a Doppler shift comprises:
coherently mixing the reflected light with light from at least one reference beam to generate at least one mixed signal; and

determining whether the at least one mixed signal comprises a signal component having a frequency equal to a Doppler frequency shift characteristic of a component of motion of the object.

48. (Amended) A method according to claim 46 and comprising introducing a predetermined offset frequency shift in the received light that is larger than an expected Doppler shift generated by a component of motion of the object, so that the received light has a difference in frequency with respect to the reference beam light that is equal to the sum of the offset frequency shift and the Doppler shift generated by the component of motion of the object.

49. (Amended) A method according to claim 46 and comprising introducing a predetermined offset frequency shift in reference beam light that is larger than an expected Doppler shift generated by a component of motion of the object, so that a difference in frequency between the received light and the reference light is equal to the sum of the offset frequency shift and the Doppler shift generated by the component of motion of the object.

50. (Amended) A method according to claim 48 comprising determining a direction of the component of motion of the object that generates the Doppler shift responsive to whether the

Concl. magnitude of the difference in frequency between the received light and the reference light is greater than or less than the offset frequency shift.

51. (Amended) A method according to claim 45 wherein light provided by the laser is linearly polarized and comprising circularly polarizing at least a portion of the reflected light.

A10 54. (Amended) A method according to claim 45 wherein light provided by the laser is linearly polarized and comprising circularly polarizing light in a first and a second reference beam of the plurality of reference beams.

A12 57. (Amended) A method according to claim 53 and comprising determining first and second signal components respectively of the first and second mixed signals that have a frequency equal to the Doppler shift of the received light.

59. (Amended) A method according to claim 46 wherein the laser provides linearly polarized light and comprising:

- 10001519.011502
- circularly polarizing light from the laser or the reflected light;
 - mixing the circularly polarized laser or reflected light with, respectively, the reflected or laser light that has not been circularly polarized;
 - generating first and second mixed signals responsive to mixed light in first and second polarization directions respectively;
 - determining first and second signal components respectively of the first and second mixed signals that have a frequency equal to the Doppler shift of the received light; and
 - determining a direction of the component of motion of the object that generates the Doppler shift responsive to which of the first and second signal components leads the other.

A13 Cont 60. (Amended) A method according to claim 51 and comprising detecting the direction of polarization of the linearly polarized light provided by the laser.

61. (Amended) A method for determining presence of an intruder in a surveillance zone comprising detecting motion of the intruder according to claim 46.

62. (Amended) A method for monitoring status of an object in a surveillance zone comprising detecting motion of the object according to claim 46 and if the object exhibits aberrant motion generating a signal indicating the occurrence of the aberrant motion.

63. (Amended) A method for monitoring health and status of a person in a surveillance zone comprising detecting motion of the person according to claim 46 and, if the person exhibits aberrant motion, generating a signal indicating the occurrence of the aberrant motion.

64. (NEW) A motion detector according to claim 1 wherein the plurality of sensor beams comprises at least three sensor beams and at least three of the sensor beams are coplanar.

65. (NEW) A motion detector according to claim 1 wherein the plurality of sensor beams comprises at least three sensor beams and at least one of the plurality of sensor beams is not coplanar with at least two of the other sensor beams.

66. (NEW) A motion detector according to claim 1 wherein the at least one reference beam comprises a plurality of reference beams.

67. (NEW) A motion detector according to claim 66 wherein the at least one photodetector comprises a plurality of photodetectors.

68. (NEW) A motion detector according to claim 66 wherein a different one of the plurality of reference beams is incident on each photodetector.

69. (NEW) A motion detector according to claim 1 wherein the at least one photodetector is a single photodetector.

70. (NEW) A motion detector according to claim 1 and comprising a motor or actuator that cyclically moves the light distributor back and forth in a given direction so that frequency of light in the at least one reference beam is shifted by a predetermined frequency shift.

71. (NEW) A motion detector according to claim 1 comprising an optical frequency shifter through which light reflected from the body passes, which optical frequency shifter generates a predetermined frequency shift in the frequency of the reflected light.

72. (NEW) A motion detector according to claim 70 wherein the predetermined frequency shift is greater than an expected Doppler shift of the reflected light caused by motion of the body.

73. (NEW) A motion detector according to claim 72 wherein the circuitry processes signals from the at least one photodetector to determine a frequency difference between the frequency of a reference beam of the at least one reference beam and the frequency of the reflected light and determines that a component of motion of the body that generates the Doppler shift is in a first direction if the frequency difference is greater than the predetermined difference and in a second direction, opposite the first direction, if the frequency difference is less than the predetermined frequency difference.

74. (NEW) A motion detector according to claim 67 and comprising a first and a second linear polarizer through which light that is incident on a first and a second photodetector respectively of the plurality of photodetectors passes.

75. (NEW) A motion detector according to claim 74 wherein directions of polarization axes of the first and second polarizers are not parallel.

76. (NEW) A motion detector according to claim 75 wherein the polarization axes of the first polarizer is substantially orthogonal to the axes of polarization of the second polarizer.

77. (NEW) A motion detector according to claim 74 wherein the reference beams that are incident on the first and second photodetectors are generated by the distributor from light from a same laser of the at least one laser, which laser provides linearly polarized light.

78. (NEW) A motion detector according to claim 77 comprising a polarization detector that detects the direction of polarization of the light from the laser.

79. (NEW) A motion detector according to claim 77 wherein an angle between the polarization direction of the first linear polarizer and the polarization direction of the laser light is substantially equal to 45° .

80. (NEW) A motion detector according to claim 77 and comprising a circular polarizer that circularly polarizes the reflected light.

81. (NEW) A motion detector according to claim 77 and comprising a circular polarizer that circularly polarizes light in the reference beams.

82. (NEW) A motion detector according to claim 80 wherein the first and second photodetectors respectively generate first and second signals responsive to reflected light and reference beam light incident on them, which first and second signals comprise, respectively, first and second signal components having a frequency equal to the Doppler frequency shift of the reflected light caused by motion of the body.

83. (NEW) A motion detector according to claim 1 wherein a photodetector of the at least one photodetector is a polarization sensitive photodetector sensitive to light in first and second directions of polarization, which photodetector generates first and second signals that are substantially independent of each other responsive to intensity of light incident on the photodetector having a polarization direction parallel respectively to the first and second directions.

84. (NEW) A motion detector according to claim 83 and comprising a circular polarizer that circularly polarizes the reflected light.

85. (NEW) A motion detector according to claim 83 and comprising a circular polarizer that circularly polarizes light in the reference beams.

86. (NEW) A motion detector according to claim 84 wherein the polarization sensitive photodetector receives light from a single reference beam and reflected light from a sensor beam, both reference and sensor beams being generated by light from a same single laser of the at least one laser, and wherein the first and second signals have first and second signal components

characterized by a frequency equal to a Doppler frequency shift of the reflected light caused by motion of the body.

87. (NEW) A motion detector according to claim 82 wherein the circuitry determines which of the first and second signal components leads the other and if the first signal component leads the second signal component determines a first direction for a component of motion of the body that generates the Doppler shift and if the second signal component leads the first signal component determines a second direction for the component of motion which second direction is opposite the first direction.

88. (NEW) A motion detector according to claim 1 wherein the at least one laser comprises a plurality of lasers.

89. (NEW) A motion detector according to claim 88 wherein at least one of the lasers of the plurality of lasers provides light having a wavelength different from light provided by another laser of the plurality of lasers.

90. (NEW) A motion detector according to claim 1 wherein light provided by a laser of the at least one laser is IR light.

91. (NEW) A motion detector according to claim 1 and comprising at least one source of visible light, wherein when the at least one source is turned on, light from the source illuminates at least one region of the surveillance zone that is illuminated by light from a sensor beam of the at least one sensor beam.

92. (NEW) A motion detector according to claim 1 wherein the at least one reference beam does not extend into the surveillance zone.

~~93.~~ (NEW) An intruder detection system for detecting presence of an intruder in a surveillance zone comprising a motion detector according to claim 1 wherein if the motion detector senses motion of a body in the surveillance zone, the circuitry determines if the Doppler shift is characteristic of motion of an intruder, and if it does generates a signal indicating presence of an intruder in the surveillance zone.

94. (NEW) Apparatus for guarding an object against theft or damage comprising a motion detector according to claim 1 wherein at least one sensor beam of the motion detector is incident on the object and, if the object exhibits aberrant motion, generates an alarm.

95. (NEW) Apparatus for monitoring health status of a person comprising a motion detector according to claim 1 wherein at least one sensor beam of the motion detector is incident on the person and, if the person exhibits aberrant motion, generates an alarm.

96. (NEW) Apparatus according to claim 95 wherein the person is a baby and wherein a sensor beam of the motion detector is incident on the baby so as to detect breathing motions of the baby and if the breathing motions exhibit aberrance generates an alarm.

97. (NEW) A method according to claim 42 wherein determining a Doppler shift comprises:

coherently mixing the reflected light with light from at least one reference beam to generate at least one mixed signal; and

determining whether the at least one mixed signal comprises a signal component having a frequency equal to a Doppler frequency shift characteristic of a component of motion of the object.

98. (NEW) A method according to claim 42 and comprising introducing a predetermined offset frequency shift in the received light that is larger than an expected Doppler shift generated by a component of motion of the object, so that the received light has a difference in frequency with respect to the reference beam light that is equal to the sum of the offset frequency shift and the Doppler shift generated by the component of motion of the object.

99. (NEW) A method according to claim 42 and comprising introducing a predetermined offset frequency shift in reference beam light that is larger than an expected Doppler shift generated by a component of motion of the object, so that a difference in frequency between the received light and the reference light is equal to the sum of the offset frequency shift and the Doppler shift generated by the component of motion of the object.

100. (NEW) A method according to claim 99 comprising determining a direction of the component of motion of the object that generates the Doppler shift responsive to whether the magnitude of the difference in frequency between the received light and the reference light is greater than or less than the offset frequency shift.

101. (NEW) A method according to claim 96 wherein light provided by the laser is linearly polarized and comprising circularly polarizing at least a portion of the reflected light.

102. (NEW) A method according to claim 101 and comprising linearly polarizing light in a first and second reference beam of the plurality of reference beams in first and second directions respectively.

103. (NEW) A method according to claim 102 and comprising linearly polarizing first and second portions of the circularly polarized reflected light in the first and second directions and coherently mixing the first and second portions of the reflected light with light in the first and second reference beams respectively so as to generate first and second mixed signals.

104. (NEW) A method according to claim 96 wherein light provided by the laser is linearly polarized and comprising circularly polarizing light in a first and a second reference beam of the plurality of reference beams.

105. (NEW) A method according to claim 104 and comprising linearly polarizing first and second portions of the reflected light in first and second directions respectively.

106. (NEW) A method according to claim 105 and comprising linearly polarizing the circularly polarized light in the first and second reference beams in the first and second directions respectively and coherently mixing the linearly polarized reference beam light with the first and second portions of the reflected light respectively so as to generate first and second mixed signals.

107. (NEW) A method according to claim 106 and comprising determining first and second signal components respectively of the first and second mixed signals that have a frequency equal to the Doppler shift of the received light.